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This is the second in a series of related publications concerning Hospital Central Medical and Surgical Supply Services. The first, which appeared in 1964, was "Hospital Central Services. A Survey of Current Literature," Public Health Service Publication No. 930 G 8. Other publications will present procedures for operation and guidelines for organizing, designing, and equipping Hospital Central Medical and Surgical Supply Services.

a study of HOSPITAL CENTRAL MEDICAL and SURGICAL SUPPLY SERVICES

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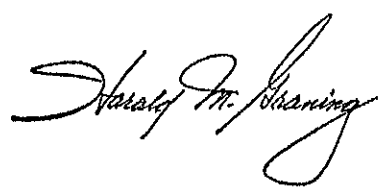
Foreword

THIS DOCUMENT was developed by the Division of Hospital and Medical Facilities in response to the need and demand for authoritative materials for planning, organizing, and operating hospital central medical and surgical supply services. It is the second of a series; the first was an annotated bibliography resulting from a survey of literature covering the period from 1955 to 1963.

The study reported in this document was conducted to obtain information on the present-day functioning of the central medical and surgical supply services in non-Federal short-term general hospitals. Organization, scope of services, physical facilities and equipment, and operational problems are discussed. Suggestions considered useful in planning and organization are also presented.

Another publication in process, based on the study findings and information obtained from visits to CMSSS departments in 42 hospitals, will present planning guidelines for the organization, design, and equipment of this department.

Appreciation is extended to the members of the National Association of Hospital Central Service Personnel and many others who participated in this study.



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Summary

THE DIVISION OF HOSPITAL AND MEDICAL FACILITIES undertook a study of current practices and conditions in central medical and surgical supply services (CMSSS) in general hospitals with a view toward developing operation, organization, and design guidelines. The responses to a questionnaire by 251 non-Federal short-term general hospitals were summarized and analyzed. No attempt was made to project the findings or determine how representative they are of other hospitals. Subsequent visits to 42 of the hospitals studied helped to clarify and document the data obtained and to formulate the recommendations on which to base a planning guide now in preparation.

THE HOSPITALS STUDIED

The 251 hospitals reporting ranged in size from 50 to more than 1,000 beds, with an average size of approximately 300 beds. The hospitals reported 76,421 beds, of which nearly 75 percent were surgical and medical. Those remaining were classified as obstetrical, pediatric, or other.

The scope of services performed by the CMSSS in the reporting hospitals showed a wide variation. Generally, the services included collecting, receiving, processing, storage, inventory control, issuing, and distribution of supplies and equipment to all departments that render patient care.

ORGANIZATION

Although the title of the department varied, and and at times the services were not organized as a separate department, the most appropriate title appeared to be "central medical and surgical supply service" (which is often shortened to central service).*

*Throughout this publication, "central medical and surgical supply service" is used to refer to this service in a single hospital. The plural form is used when the service in two or more hospitals is meant. The initials, CMSSS, are used for either the singular or the plural form. Generally, the context will indicate which is intended.

The existing administrative structure of CMSSS departments frequently varied from the preferred pattern of administration. Of 247 CMSSS supervisors responding to an inquiry concerning their immediate supervisor, 78 percent reported that they were presently responsible to the director of the nursing department, while only 60 percent considered this arrangement the most desirable for optimum efficiency. In other hospitals, the supervisory responsibility lay with the hospital administrator (17 percent), the surgical suite supervisor, or the pharmacist.

Committees

Slightly more than a third of the hospitals reporting had an advisory committee to the CMSSS, and most of these committees had representatives only from administration and nursing service. Apparently, more hospital administrators should consider establishing and maintaining such advisory committees, which should include representation from all related departments.

Participation by the CMSSS supervisor on all committees which are closely related to that department's work would also appear advisable.

employees in the hospitals with 500 beds and over. Part-time personnel were employed by 172 hospitals, and 90 hospitals reported that additional personnel were needed for optimum efficiency.

No uniform standards for personnel requirements could be established from the data reported because of the variations in scope of functions, scheduled hours of service, methods of distribution and collection, the systems used to dispense supplies and equipment, and the physical facilities and processing equipment.

Three-fifths of the CMSSS supervisors had 5 years or more of experience, and 13 percent had 15 years or more. The average (median) length of service was 7.6 years. Most were registered nurses (88 percent); 5 percent were licensed practical nurses and 7 percent were not nurses.

Fewer of the nonsupervisory personnel were registered nurses and licensed practical nurses in small hospitals (30 percent) than in hospitals having 500 beds and over, where 80 percent were nurses.

Methods of Distribution and Collection

Carts, dumbwaiters, vertical conveyors, elevators, pneumatic tubes, or messengers—or various combinations of these methods of distribution and collection are used. The proper combination depends on the design, organization, and size of the hospital.

SERVICES

Each hospital has to decide whether the increased efficiency in controlling supplies and equipment will offset the additional cost of staffing in determining whether CMSSS should be operated 24 hours a day or less. Of 249 replies to an inquiry about hours of service, 116 indicated that CMSSS were open 24 hours a day and 133, less than 24 hours—ranging from 8 to 16 hours a day.

In general, services are rendered to the following departments: nursing units, surgical suite, labor-delivery unit, nursery, outpatient department (including emergency room), radiology, clinical laboratory, pharmacy, and research. The nursing units were the largest consumers of materials from CMSSS with the outpatient department ranking as second; the surgical suite, third; the labor-delivery unit, fourth; and the nursery, fifth.

The types of supplies and equipment provided may vary with the policies of the hospital, the extent disposables are used, and the number of specialty departments. A general listing, together with possible variables, was developed from the study.

Processing of Supplies and Equipment

The functions necessary in the processing of supplies and equipment are noted in the study. Although these may vary with the use of disposables, they include: receiving; sorting; cleaning; assembling; inspecting; packaging; and labeling; preparing external solutions and linen packs; sterilizing; storing; controlling inventory; and issuing.

Use of Supplies and Equipment

A lack of uniformity in maintaining records of the supplies and equipment was found; in fact, some hospitals reported that they kept no records. In others, only the record of reusable items was kept in CMSSS, with disposables issued by general stores; or records of certain items were kept in combination in one hospital and separately in another. Thus, the responses did not provide comparable data.

PHYSICAL FACILITIES AND EQUIPMENT

Additional responsibilities assigned to CMSSS and the increased need for storage areas for disposable items tended to make these services increase in size and caused many hospitals to report that additional space was needed. Workflow, new kinds of equipment, and new systems of mechanization also contributed to the need for changes in physical facilities.

OPERATING PROBLEMS

Two basic problems facing CMSSS were reported: (1) Failure of administration and other departments of hospitals to recognize the importance of CMSSS, and (2) insufficient consideration of CMSSS in long-range planning. Both of these problems added to the difficulties of operating the service effectively.

More immediate problems were classified as those related to organization, operations, and physical facilities and equipment.

Organizational Problems

Either too much or too little centralization made for an inefficient service. Both situations were reported. Closely related were problems of standardizing trays and sets and establishing standard procedures.

Numerous problems related to personnel, such as the difficulty of attracting and retaining competent personnel at the salaries paid, the difficulty of providing job satisfaction in some jobs, the inability of some workers to understand and carry out the procedures properly and to grasp the importance of the work they were doing. Lack of time to train and supervise employees and to rewrite procedures manuals, and the need for more effective inservice programs were also listed as problems.

In distribution and collection of supplies and equipment, problems of time and personnel requirements were encountered, particularly when mechanized facilities were not available and messengers were relied upon.

Problems in communication systems ranged from a lack of adequate physical means of communication to that of maintaining communications with all levels of hospital personnel. Some of these problems stemmed from the absence of written policies, procedures manuals, monthly newsletter, meetings with other department heads, and adequate inservice education.

The greatest problem reported in providing service in departments open less than 24 hours a day was that of control, since the responsibility for dispensing supplies and equipment after hours must be delegated to other staff. Rotation of supplies, staffing problems, use of part-time personnel, and lack of adequate personnel, equipment, and facilities to carry out the functions assigned to the department were among the other problems listed.

Operational Problems

Operational problems included processing of supplies and equipment; delivery of supplies and return of equipment; waste of supplies; misuse of equipment; control, return, and maintenance of equipment; control of contaminated supplies and equipment; charges; budget and purchasing problems; and others.

Physical Facilities and Equipment

Inadequate floor area was the major problem reported with regard to physical facilities and equipment. Poor workflow patterns, the distance between CMSSS and the elevators, dumbwaiters and other such facilities, the lack of equipment, use of outdated equipment, and difficulties in proper maintenance of equipment were also cited.

SUGGESTIONS FOR PLANNING AND ORGANIZATION

Many valuable suggestions for planning and organizing CMSSS were identified during the study. Among them were the following:

- A programing committee should be established prior to the actual planning of the department and should include personnel who are currently working in CMSSS and who keep up to date on new techniques.

- To improve communications, an advisory committee and a standardization committee should be appointed; a procedures manual should be prepared listing all contents of trays, and a file index should be established specifying where all supplies are located in the department; the CMSSS supervisor should be appointed to the committees on nursing procedures, standardization, hospital infection, and disaster.
- Distribution of supplies and equipment should be the responsibility of CMSSS, and a control system for portable equipment should be set up.
- A collection schedule and specific procedures for collection should be established.
- There should be greater participation of CMSSS personnel in local and national organizations as well as attendance at workshops and institutes.

Part I

Background of the Study

In the years following World War II, central medical and surgical supply services in hospitals have grown very rapidly, many without sound, programed planning for organization, physical facilities, equipment, and efficient methods of operation. In addition, existing literature does not always appear to be adequate in providing guidelines.

As a result, supervisors of CMSSS and others responsible for such services expressed an urgent need for a thorough study of current practices and conditions, leading to the development of guide materials relating to the planning, organization, physical facilities and equipment, and operation of CMSSS in hospitals.

Hospital administrators today recognize the CMSSS as one of the most important service departments in the hospital. Yet, no uniformity exists among hospitals in defining the functions of this department, providing adequate facilities with modern equipment, applying techniques of methods improvement, and carefully selecting and training staff. Study, research, and development of these services are greatly needed as a means of controlling costs, providing quality in supplies and equipment, and promoting the most effective utilization of personnel and materials.

The CMSSS is a vital factor in providing improved patient care efficiently and economically. The achievement of this goal is contingent upon the organization, personnel, methods of operation, physical facilities, and equipment of the service.

To deal with the need for evaluating the current situation and for developing planning guidelines, this study was undertaken by the Division of Hospital and Medical Facilities.

METHODOLOGY

Development of Questionnaire

A questionnaire was devised for the purpose of obtaining pertinent, detailed information on organization, scope of services, physical facilities, equipment, and methods of operation. In addition, questions were designed to elicit the problems encountered in the operation of these departments and suggestions useful to hospitals in the future planning and organization of CMSSS.

The questionnaire was then reviewed critically by a number of hospital CMSSS supervisors, representatives of various divisions of hospital work, and by executive officers of the National Association of Hospital Central Service Personnel.

3. In your opinion, what do you consider to be the most serious problems in the efficient operation of your department?

The National Association of Hospital Central Service Personnel cooperated in mailing the questionnaire to their members.

Analysis and Interpretation of Findings

For the purpose of this study, the analysis of survey findings was limited to data on non-Federal short-term general hospitals. Completed questionnaires were received from 251 such hospitals located in 38 States. The information from the questionnaires has been summarized and presented with no attempt made to project the findings or to determine how representative the results are on a universal basis.

Visits to Hospitals

Subsequent visits to CMSSS in 42 of these hospitals of various bed sizes helped to clarify and document the data obtained through the questionnaires and to formulate recommendations concerning the future planning and operation of hospital CMSSS.

Part II

Interpretation of Data

Chapter I

The Hospitals Studied

The information presented in Part II is based primarily on data obtained from completed questionnaires for 251 non-Federal short-term general hospitals which have organized central medical and surgical supply services. (See appendix table A for State distribution.)

NUMBER AND SIZE

The 251 hospitals included in the study ranged in size from 50 to more than 1,000 beds, with an average size of approximately 300 beds. Table 1 shows the number of hospitals and beds within selected bed-size groups. (For percentage distribution, see appendix table B.)

Table 1. Number and Size of Hospitals, 1963

Size of hospital	Hospitals	Beds
Total number reported	251	76,421
50–99	21	1,668
100–199	62	9,429
200–299	63	15,579
300–499	67	24,261
500 and over	38	25,484

The beds were classified as surgical, medical, obstetrical, pediatric, and other major categories. Nearly 75 percent of the total number of beds were reported in the surgical and medical services category. Table 2 presents the distribution of beds by major category of service.

Table 2. Distribution of Beds by Major Category of Service, 1963

Classification	Beds
	Number

average size of the intensive care units gradually increased with the overall size of hospital, ranging from 6-bed units in hospitals having 50–99 beds to 15-bed units in hospitals having 500 beds and over. (Appendix table D.)

UTILIZATION

Nearly all hospitals included in the study reported data on inpatient utilization. Limited information on outpatient services was furnished by approximately 70 percent of the hospitals. The average day's activities, including inpatient and outpatient data, are shown in table 3.

Table 3. Average Day's Activities, 1963

Item	Hospitals reporting	Average number per hospital
Inpatient Data:		
Average daily census	249	243
Daily admissions	249	31
Births	235	5
Surgical operations	243	17
Outpatient Data:		
Individuals served daily	118	64
Daily outpatient visits	174	97

Detailed information on utilization by size of hospital is shown in appendix table E for inpatient data and appendix table F for outpatient data.

SCOPE OF SERVICES

The concept of what services are included in central medical and surgical supply services differs widely among hospitals. The conclusion drawn from the study was that these should include receiving, collecting, cleaning, preparation, sterilization, storage, issuing, and distribution of supplies and equipment to all departments rendering patient care. The supplies provided may include trays and sets, dressings, rubber goods, needles, syringes, linen packs for the surgical suite and the labor-delivery unit, utensils, solutions and administration sets, and some miscellaneous items such as stopcocks and armboards. The equipment may include portable, orthopedic, and inhalation therapy equipment.

Some hospitals provide additional centralized services, including the processing of thermometers, patients' bedside utensils, and all instruments and trays for the surgical suite and the labor-delivery unit. On the other hand, some hospitals do not centralize all of their medical and surgical supply services. For example, the hospital general stores may be responsible for issuing disposable items and making patient charges for certain items, with delivery made directly to the using departments. Other hospitals have their linen packs prepared in the laundry and then delivered to the CMSSS for sterlizing.

Depending on hospital policy, inhalation therapy equipment may or may not be processed by CMSSS. Because the equipment is so intricate and because inhalation therapy must be administered to the patient by either professional staff or highly trained technical staff, the more general practice is to maintain a separate inhalation therapy department.

Chapter II

Organization

TITLE OF DEPARTMENT

GENERALLY, THE DEPARTMENT'S TITLE indicated the scope of its services. The following titles were reported by hospitals as being used to identify the department providing centralized medical and surgical supply services:

- Central Medical and Surgical Supply Service
- Central Service Department
- Central Medical Supply Service
- Central Supply Department
- Central Supply Service
- Central Supply Division
- Central Supply Room
- Central Sterile Supply Department
- Central Sterilizing and Supply Department
- Central Dispatch
- Central Distribution

Whenever such titles as central service or central supply department are used, the scope of services may include supplying all departments with supplies and equipment.

In general, central dispatch or distribution is used to designate one of a group of services under the direction of an assistant administrator. The others may include purchasing, general stores, laundry, housekeeping, messenger service, and maintenance.

If the title is central sterile supply or central sterilizing and supply department it may (but does not always) indicate that the services are limited to providing only sterile medical and surgical supplies, or perhaps only the reusable supplies processed and issued as sterile supplies.

Central medical and surgical supply service seems to be the most appropriate title if the department is organized to provide all of the needed supplies and equipment to all departments rendering patient care.

ADMINISTRATIVE STRUCTURE

Administrative Responsibility

There are several patterns of the administrative structure of central medical and surgical supply services. Most supervisors of these services were directly responsible to the hospital administrator or his assistant or the director or assistant director of the nursing department. In a few cases the supervisors were directly responsible to either the surgical suite supervisor or the pharmacist.

Of the 247 CMSSS supervisors responding to the question concerning their immediate superior, 78 percent were responsible to the director of the nursing department, 17 percent to the hospital administrator, and 5 percent reported either to the surgical suite supervisor or the pharmacist.

In answer to the question "In your opinion, for optimum efficiency, to whom would you have the supervisor responsible?" the replies showed that nearly 36 percent preferred to be responsible to the hospital administrator or his assistant. (Appendix table G.)

Apparently, more hospital administrators need to establish and maintain advisory committees, including representatives from all of the various related departments, to make recommendations for the effective operation of the central medical and surgical supply services.

Committee Participation of Supervisors

Equally as important, and unfortunately not in practice in many hospitals, is the participation of the CMSSS supervisor on committees which bear an important relationship to the CMSSS. Such committees include the hospital infection committee, nursing procedures or improvement of patient care committee, disaster committee, and standardization and product evaluation committee.

When a hospital is planning any reorganization of this department or areas having any relationship to this department, the CMSSS supervisor should be a member of the planning committee.

Policy and Procedures Manuals

Generally, policy manuals are written for the nursing department or the hospital as a whole, and not specifically for the CMSSS. Some procedures manuals are limited to listing contents of trays and describing techniques used in the preparation of trays. Others may include all cleaning procedures as well as instructions for sterilization of supplies. The complete and up-to-date procedures manual is an invaluable tool, particularly for teaching new employees and for keeping all personnel thoroughly informed on current techniques and procedures.

More than 80 percent of the hospitals reported that they had policy manuals, and 95 percent provided procedures manuals for their central service personnel. (See appendix table H.) The few hospitals which did not provide procedures manuals indicated that guidelines were being furnished through a procedures committee, which included the CMSSS supervisor. No indication of the manual content was given by reporting hospitals. Subsequent visits to hospitals and the numerous requests for a procedures manual indicate that the existing information in most procedures manuals is inadequate.

Inservice Programs

Of the 211 hospitals reporting information on inservice programs, 88 percent reported that they had a program to provide on-the-job training for new employees. For CMSSS personnel, this program usually consists of orientation sessions on the organization and functions of the department; proper instructions and demonstrations in the use of equipment; and the observation of experienced personnel in the use of efficient methods for CMSSS procedures. (See appendix table H.)

PERSONNEL

Number and Type

The average number of full-time personnel employed in the services studied ranged from about 5 employees in hospitals having 50–99 beds to 32 employees in the hospitals with 500 beds and over. Some of the hospitals did not use either part-time employees or volunteer workers in the CMSSS. For the 172 hospitals having part-time personnel, there was an average of one part-time personnel per hospital (based on full-time equivalents).

Greater use of part-time personnel by this department would increase the responsibility for orientation and training. It could reduce stability and efficiency. Both are serious factors in a service where errors may have serious consequences for patients. Where part-time employees were utilized, they usually served as aides, orderlies, and volunteers. In some departments, high school or college students were employed for afternoon and weekend tours of duty. Chart 1 shows the average number of full-time and part-time personnel presently employed in CMSSS as well as the additional personnel needed for optimum efficiency, as reported by 90 of the 251 supervisors.

The various types of personnel working in this department and their titles include:

- Director, Manager, Chief, Supervisor, or Head Nurse
- Assistant Supervisor, Evening or Night Supervisor
- Foreman, Forelady
- Central Service Aide (or Assistant), Central Service Technician, or Work Section Leader
- Clerk, Secretary
- Messenger, Orderly
- Assembler
- Autoclave Operator
- Oxygen Therapist, Oxygen Technician
- Surgical Technician
- Seamstress

Stock Room Man
Housekeeping Aide
Volunteer, Junior Helper

The average number of CMSSS personnel by size of hospitals is shown in appendix table I. These figures indicate the number of full-time personnel, the number of part-time personnel, the total full-time equivalent, and the additional number of full-time personnel needed in the department.

Factors Affecting Personnel Requirements

No uniform standards for personnel requirements can be drawn from these data because of the great variation in the following factors:

- *Scope of functions.*—The specific functions assumed by CMSSS vary from hospital to hospital. In addition to basic supplies, some may be responsible for processing instruments for the surgical suite and the labor-delivery unit, as well as being responsible for all portable, orthopedic, and inhalation therapy equipment.
- *Scheduled hours of service.*—The hours CMSSS are open vary greatly. Some are open less than 24 hours per day, while others provide continuous service throughout the day including weekends and holidays.
- *Methods of distribution and collection.*—The use of mechanical devices, such as vertical conveyors and dumbwaiters, is significant in the planning of personnel requirements. If mechanical devices are not utilized, or if used but not located in or near the CMSSS, more time and additional personnel will be required for distribution and collection. Another factor is the recommended collection of used equipment at scheduled hours by CMSSS personnel, rather than the return of used materials at irregular hours by using departments' personnel.
- *Dispensing of Supplies and equipment.*—The type of dispensing system used also affects personnel needs. The quota system, when compared to the regular complete stock-cart issue, requires additional time not only in unloading the supplies and equipment but in arranging them in unit cabinets.
- *Physical facilities and processing equipment.*—Many variations were found in the physical facilities and equipment in CMSSS. More production, with less personnel, can be expected if these services are physically located so that they are easily accessible to using departments and are planned to provide proper workflow, thereby eliminating any unnecessary steps in the performance of work. Time-saving equipment such as ultrasonic cleaners, flask washers, and high speed sterilizers may be provided.

Problems affecting personnel are discussed in chapter V.

Highest-Skill Level of CMSSS Staff

Of the 251 supervisors reporting information on their educational and experience background, 88 percent were registered nurses; 5 percent were licensed practical nurses; and the remaining 7 percent were in the non-nurse category. (Table 4.)

Where the licensed practical nurse is supervisor, she usually functions under the general direction of the director or assistant director of the nursing department. The supervisors in the non-nurse category reported having experience background as pharmacists, industrial engineers, laboratory technicians, and business managers.

Table 4. Highest-Skill Level of CMSSS Staff

Size of hospital	Number of hospitals reporting	Supervisory positions			Nonsupervisory positions		
		Registered nurse	Licensed practical nurse	Non-nurse	Registered nurse	Licensed practical nurse	Non-nurse [1]
		Percent of hospitals reporting					
Total	251	87.6	4.8	7.6	29.5	16.7	53.8
50– 99	21	81.0	9.5	9.5	9.5	19.1	71.4
100–199	62	85.5	8.1	6.4	8.1	14.5	77.4
200–299	63	92.1	–	7.9	27.0	15.9	57.1
300–499	67	89.5	3.0	7.5	37.3	19.4	43.3
500 and over	38	84.2	7.9	7.9	65.8	15.8	18.4

[1] Includes CMSSS aides, nursing aides, ward clerks, typists, orderlies, and messengers.

Chapter III

Services

SCHEDULED HOURS OF SERVICE

From the 249 replies to the question concerning the hours of service maintained, it was learned that 116 CMSSS were open 24 hours per day. (See appendix table K). The 133 services open less than 24 hours per day were generally open 8, 10, 12, or 16 hours per day.

In hospitals where the service is not open 24 hours a day, usually the afternoon and night-duty administrative nursing supervisors are delegated the responsibility and authority to enter the department during unscheduled hours to obtain necessary supplies and equipment. The problems which sometime arise in the control of supplies and equipment under this system are discussed in chapter V.

When it is possible to keep a department open 24 hours a day, lower quotas of supplies may be issued, decreasing the amount of storage space required in using departments. However, the additional cost of staffing the service 24 hours per day should be carefully studied; it may be possible to reschedule workloads, so that some operations may be performed during the afternoon and night hours, with personnel reassigned accordingly.

DEPARTMENTS SERVICED

Departments to be serviced include all those which may require supplies and equipment to render patient care, such as:

Nursing Units	Radiology
Surgical Suite	Clinical Laboratory
Labor-Delivery Unit	Pharmacy
Nursery	Research Departments
Outpatient Department (including emergency room)	

In general, the nursing units were the largest consumers of materials from the CMSSS with the outpatient department ranking as second; the surgical suite, third; the labor-delivery unit, fourth; and the nursery, fifth. In this study, the intensive care units and postoperative recovery rooms were included in the category of nursing units and the emergency room as a part of the outpatient department.

The extent of services received by the radiology department varied from hospital to hospital; the same applied to research departments, clinical laboratory, and pharmacy departments. The advent of commercially prepared parenteral solutions has diminished the previously close relationship between the pharmacy and the CMSSS. For the most part, the materials now requested from the CMSSS by the pharmacy are sterile saline solution and distilled water and, as needed, sterilization of certain items.

TYPE OF MATERIALS PROVIDED

Appendix table L shows the type of materials most frequently provided by CMSSS to the five departments which are the largest consumers. The medical and surgical supplies and equipment provided by this department include the following:

- Dressings
- Needles and syringes
- Rubber goods, (gloves, catheters, tubing)
- Solutions, (parenteral and external)
- Administration sets
- Instruments
- Thermometers
- Treatment trays and sets
- Utensils
- Linen packs

- Miscellaneous items such as stopcocks, binders, and armboards
- Portable equipment
- Orthopedic equipment
- Inhalation therapy equipment

Thermometers, Patients' Bedside Utensils

Thermometers and patients' bedside utensils, such as bath basins and bedpans, should be processed in CMSSS, where many hospitals have already delegated these functions.

In hospitals where patients' bedside utensils are not processed in CMSSS, the method of care of the utensils was found to be either of the following:

a. Utensils may be either washed and chemically disinfected or washed and sanitized on the nursing unit by either nursing or housekeeping personnel, after which they may or may not be bagged for issue;

b. Patients' bedside utensils may be washed by housekeeping personnel, assembled in paper bags, and delivered to CMSSS for sterilization.

Disposables

All hospitals today use some disposable supplies, although the extent of their use varies considerably from hospital to hospital. Supplies used, which may be disposable, include such items as:

- Catheters, various types
- Drainage bags
- Emesis basins
- Gloves (examining and surgical)
- Miscellaneous items such as stopcocks, and armboards
- Mouth-wash cups
- Needles, all sizes
- Needle and syringe combinations, all sizes
- Syringes, all sizes; including irrigating
- Trays and sets, such as administration, treatment, suture
- Tubes, various types, and tubing
- Commercially prepared parenteral and external solutions

Many CMSSS maintain certain items such as syringes and needles in both reusable and disposable items.

Instruments

Instruments included in trays and sets as well as those used in the surgical suite, labor-delivery unit, outpatient department, radiology, and other departments must be processed. Processing includes cleaning, selecting, wrapping, labeling, and sterilizing the instruments.

Some CMSSS process special trays for specific departments such as the labor-delivery unit, the surgical suite, radiology, and clinical pathology, while others receive these special trays already prepared and are only required to sterilize them.

The surgical instruments for the labor-delivery unit and the surgical suite may be processed in CMSSS or, as with special trays, CMSSS may only be responsible for sterilizing the prepared instrument sets as they are received from these departments. In some hospitals a third method is used: the labor-delivery unit and the surgical suite retain complete responsibility for processing surgical instruments in their areas.

In the hospitals where the function of processing instruments was delegated to CMSSS, the decision was made in the early stages of planning the hospital so that the necessary distribution and collection systems and additional space and equipment could be provided.

Linen Packs

- Basic packs
  - Surgical
  - Delivery
- Special packs
  - Neurological
  - Orthopedic

Again, as in the case of instruments, providing linen packs may mean several operations; for example: (1) processing packs, which includes receiving the clean linen from the laundry; examining the linen for holes or tears; selecting, wrapping, and labeling for specific procedures; sterilizing; storing and issuing to specialty areas and nursing units; (2) sterilizing the packs which have been prepared and delivered by personnel from the surgical suite and the labor-delivery unit, storing, and issuing as requested.

Portable Equipment

Portable equipment includes equipment such as:

- Alternating pressure pad mattresses
- Defribrillators
- Drainage apparatus
- Infusion stands
- Bed cradles
- Suction apparatus
- Thoracic suction pump
- Pacemakers

Orthopedic Equipment

As with inhalation therapy equipment, the responsibility for orthopedic equipment may be delegated to CMSSS or to a separate section, with the orthopedic technician responsible to the chief of orthopedic surgery.

Specific areas for cleaning and storing orthopedic equipment will be required. Provision must also be made for the inspection and repair of equipment.

Types of orthopedic equipment include:

- Fracture beds
- Turning frames
- Overhead frames
- Splints
- Slings
- Orthopedic cart with visible file of instructions and accessories
- Walkers
- Crutches and canes
- Traction equipment
- Cast cutter and cast spreader
- Plaster saw and knife
- Patient lifters

Inhalation Therapy Equipment

Inhalation therapy equipment includes the following:

- Oxygen tents
- Intermittent positive-pressure apparatus
- Group tents
- Inhalators and vaporizers
- Accessories such as
  - Flowmeters
  - Nebulizers
  - Miscellaneous items such as masks, nasal catheters, and tubing

Items such as nasal catheters, masks, and tubing generally are provided by the CMSSS. Inhalation therapy apparatus itself also may be the responsibility of CMSSS unless a separate inhalation therapy department is provided, with the inhalation therapist responsible to the anesthesiologist or other medical staff. Where a separate department exists, the disposable items such as nasal catheters, masks, and tubing may be issued by CMSSS or directly from general stores. In either case, specific facilities must be provided for cleaning the equipment, with items requiring sterilization routed to CMSSS.

As a rule, the surgical suite, postoperative recovery room, intensive care unit, the labor-delivery unit, nursery, and emergency room have been provided inhalation therapy equipment and require additional equipment only in emergency situations. In larger hospitals, the trend seems to be moving toward having a separate inhalation therapy department, with disposable accessory items issued to it directly from general stores.

PROCESSING OF SUPPLIES AND EQUIPMENT

The processing of supplies and equipment may be defined as the preparation of supplies and equipment for use in rendering patient care. The processing operations necessary for reusable items include receiving, sorting, (soaking for some items), cleaning, assembling, inspecting, packaging, labeling, sterilizing, storing, inventory control, and issuing. When disposables are used a number of operations are eliminated, but the following are still necessary: receiving, storing, inventory control, and issuing.

In more detail, the operations are as follows:

1. Receiving supplies and equipment includes:
   - Soiled supplies and equipment from using departments;
   - Outdated supplies from using departments;
   - New supplies and equipment from general stores;
   - Linen from laundry for preparation of packs.

2. Sorting materials requires the grouping of the same types of materials such as glassware, rubber goods, and instruments prior to cleaning.

3. Cleaning materials requires using specific techniques for each type of material cleaned; for example, glassware, utensils, and gloves.

4. Assembling, inspecting, packaging, and labeling operations each require detailed attention in the final preparation for use of materials such as trays and sets, needles, syringes, gloves, utensils, and surgical packs.

5. Preparing external solutions includes preparation of the solution and filling, capping, labeling, and sterilizing.

6. Sterilizing materials includes sterilization by either steam under pressure, dry heat, or ethylene oxide.

7. Storing all medical and surgical supplies and equipment requires providing specific areas for the following:

- Nonsterile materials which are used for the processing of materials;
- Equipment such as portable, orthopedic, and inhalation therapy equipment;
- Sterile disposables; and
- Sterile supplies.

8. Inventory control establishes a level of supplies needed to provide services to the hospital and eliminates guesswork in purchasing.

9. Issuing of supplies and equipment requires conveyances such as cart, elevator, dumbwaiter, or vertical conveyor.

Parenteral Solutions

Because of the risks involved and the many types required, very few hospitals today prepare parenteral solutions. They are purchased, along with administration sets. External solutions, however, are usually prepared in CMSSS and are limited to sterile normal saline solution and sterile distilled water. Other solutions, such as boric acid, should be prepared in the pharmacy.

USE OF SUPPLIES AND EQUIPMENT

Maintaining Records

There seems to be little uniformity in maintaining records of the use of central medical and surgical supplies and equipment. Some hospitals maintain daily production records, daily records of issue of supplies, monthly production reports, monthly inventory reports, monthly inventory losses, and monthly inventory gains. Other hospitals maintain some of these, while a number of hospitals do not keep any records.

Average Monthly Use

Ten of the most frequently used items were selected to show the average monthly use of supplies by size of hospital. (See appendix table M.)

The following comments are of significance in explaining why more complete figures were not obtained in the average monthly use of supplies or why the figures given may appear low, for example, the use of gloves, needles, syringes, trays, and sets.

- Records of issue are not maintained.
- Records of issue are kept only for reusable items.
- Records of issue of disposable items may be maintained by general stores in hospitals where disposable items such as administration sets, gloves, needles, syringes, and trays are issued directly to using departments.

ISSUING DISPOSABLE ITEMS

Most of the CMSSS today are responsible for the issuing of disposable items. However, in some hospitals the system has been developed whereby disposable items are issued directly from general stores to the using department, such as the surgical suite, recovery and intensive care units, outpatient department, and to intravenous therapy teams. Charges to consumers are made by general stores. The greatest advantage to this system is in economy, as handling and storage operations by CMSSS are eliminated. A disadvantage to using departments is the increased storage requirement and larger standard inventory to meet weekend and holiday needs; in addition, some administrators believe that it is more difficult to control a larger inventory in using departments.

Chapter IV

Physical Facilities and Equipment

AVAILABILITY OF AREA

The most significant information received in relation to physical facilities related to space, that is floor area. In appendix table N, the reported and estimated need of net square feet of floor area is shown. Of the total of 251 respondents, 187 reported the average square feet of area assigned to the CMSSS and only 71 reported the estimated need.

Many respondents indicated that the present floor area was inadequate without specifying the total floor area needed. Rather, comments were made such as: "need more storage space, large equipment stored in five separate rooms (sometimes on different floors)," "need more sterilizing area," "need supervisor's office," or "need larger cleanup area."

Some respondents indicated that plans were being made to enlarge CMSSS and others specified that, with expansion, areas would be allocated to include necessary areas for the orthopedic, portable, and inhalation therapy equipment.

A number of supervisors indicated that some disposable items were issued directly to the using units from general stores with only a minimum supply kept in CMSSS for emergency use during the hours when general stores was closed. This system helped to alleviate the need for storage areas. Others stated that some of the work areas formerly needed could now be reduced in size or entirely eliminated with the advent of disposable items. For example, the area for processing syringes and needles could be diminished in size, while the glove room could be entirely eliminated.

Additional Space Needed

On balance, however, the size of CMSSS is increasing. Respondents indicated that the greatest need for additional space was in the storage areas. This situation results from (1) the increased need for storage for disposable items and (2) the delegation to many CMSSS of the responsibility for portable, orthopedic, and inhalation therapy equipment.

Workflow

Generally, since many departments lacked adequate space, some backtracking in workflow activities could not be eliminated. While many respondents answered "yes" to the question "Are work areas so located as to permit a continuous flow of work and no unnecessary backtracking?" subsequent visits to some hospitals indicated that the question was not correctly interpreted. For example, in some CMSSS there is only one entrance, which is thus used for receiving soiled supplies and equipment, receiving materials from general stores and the laundry, and for issuing supplies and equipment. In some services having two entrances, new supplies and equipment from general stores are received through the receiving and cleanup area.

EQUIPMENT

Some respondents indicated that the use of disposables has eliminated the need for or decreased the use of certain equipment such as the needle washer, glove washer, dryer, and powderer. On the other hand, many respondents expressed a definite need for equipment such as the ultrasonic washer-rinser-dryer, flask washer, and high-speed and ethylene-oxide sterilizers, or any mechanical equipment and/or devices which may increase production.

Surprisingly, the questionnaire responses indicated that some hospitals have expensive items of equipment such as sterilizers (which are also costly to maintain) located in several different areas. These areas include the surgical suite, labor-delivery unit, nursery, formula room, emergency room, clinical laboratory, nursing units (particularly isolation units), radiology, dental, and research departments. Some respondents found maintenance of sterilizers a problem at times. For economy, facilities and equipment used for processing medical and surgical supplies should be centralized.

Automation

The word automation is widely used and sometimes misinterpreted in relation to hospitals. Automation in CMSSS pertains to mechanization of certain manual operations as well as procedures for handling materials.

Two items on the questionnaire were pertinent: "Please list any major automation in your department" and "If you were planning to have automation, what would you include?" Some comments urged mechanization wherever possible. In other words, emphasis was placed on obtaining all modern equipment, of the highest quality and the most efficient type available. If possible, most respondents thought it important to insist on trial periods before purchasing the equipment. Also, the need was recognized for continuing evaluation of all equipment developed by manufacturers.

The use of vertical conveyors and dumbwaiters for distribution and collection of supplies was specifically recommended.

Problems in relation to physical facilities and equipment are discussed in chapter V.

Chapter V

Operating Problems

An excellent response was received from CMSSS supervisors in answer to the question "What do you consider to be the most serious problems in the efficient operation of your Central Service Department? (Please list in order of importance)"

Many problems were cited; however, in summarizing, it is not possible to list them in order of importance because the problems presented seemed to be equally important in the overall efficient operation of CMSSS. The importance of the problems varied from one department to another, and in some replies all the problems listed related to one specific area because of the intensity or far-reaching effects this problem presented in a particular department.

BASIC PROBLEMS

Basic problems facing most departments are: (1) failure to recognize the importance of CMSSS; and (2) insufficient consideration of CMSSS in long-range planning.

The failure of many hospital administrators to recognize the importance of the CMSSS and to give it equal status as a department has resulted in difficulties of effective operation. The place of the central medical and surgical supply service has never been fully documented and analyzed. It is considered by many to be one of the most important and complex of all hospital services. Its value to the hospital becomes clear when its impact on the efficiency of services and the quality of patient care is emphasized.

The amount of materials purchased, processed, and issued is staggering in terms of quantity and costs. By centralizing services in one area, a duplication of expensive equipment may be avoided, thus reducing both the initial costs of equipment and maintenance costs. Use of nonprofessional personnel instead of nurses also cuts costs.

However, failure of the administration to give CMSSS equal status as a department was reported as creating difficulties in getting some personnel and/or department heads to accept the department and use its services to best advantage. This sometimes was intensified by an indifference of the nursing department to CMSSS. Other problems created through the lack of administrative support and interest are the lowered efficiency of services and quality of patient care which may result from the lack of recognition given these employees.

Respondents indicated that those engaged in long-range planning for the hospital frequently do not give sufficient consideration to CMSSS, particularly the functions of the department and how they shall be performed. In general, the CMSSS should obtain, process, maintain, and dispense the medical and surgical supplies and equipment required by medical, nursing, or paramedical personnel in all departments for the care, diagnosis, and treatment of patients.

IMMEDIATE PROBLEMS

Immediate problems in CMSSS include problems in relation to (1) organization; (2) operations; and (3) physical facilities and equipment.

Organizational Problems

As mentioned previously, the importance of the problems cited varied from one department to

another, but the more specific problems related to organization include the following:

- Centralization
- Personnel
- Standardization
- Distribution and Collection
- Communication Systems
- Services

Centralization.—Too much centralization (combining too many departments into one department) creates problems; for example, including the formula room and the general messenger service under CMSSS. On the other hand, insufficient centralization of functions, as for example, not centralizing all portable and orthopedic equipment, may be just as serious. Storing equipment in several small rooms some distance from CMSSS, or having equipment scattered throughout the hospital on various nursing units, makes for much inconvenience and wasted time in locating such equipment.

Personnel.—Numerous personnel problems were cited, ranging from the need for an organized inservice program to the supervisor's personality. Problems included:

1. The inability of some personnel to grasp the importance of following procedures in processing supplies and equipment in order to assure sterility of all supplies and good working condition of all equipment.

2. The difficulty in having all personnel follow established procedures.

3. The inability of some personnel to accept the multiplicity of everchanging techniques and products.

4. The difficulty of providing job satisfaction for some employees. The work of the department includes technical functions such as assembling trays, and routine jobs such as washing equipment and folding linen.

5. Salaries too low in many instances to attract competent employees. Low salaries were also believed to be a reason for a shortage of CMSSS personnel and much turnover.

6. The need for an effective inservice program, since most new employees have had no CMSSS experience and therefore require much training and supervision.

7. Supervision of personnel, including establishing and maintaining effective interpersonal relationships for teamwork.

8. The lack of time to properly train and supervise employees, in view of the importance of having them clearly understand procedures. A lack of time for rewriting procedures was also mentioned.

9. The difficulty of securing supervisors with management skill and technical ability.

10. The need for job descriptions for CMSSS personnel.

11. Turnover, resulting from sending personnel (including the supervisor) to other departments as "relief," and the rotating tours of duty. Apparently, permanent assignments to afternoon and night tours of duty are more acceptable than rotating tours, particularly for female personnel who must make arrangements for the care of their children.

Standardization.—The problems cited were (1) standardizing contents of trays and sets to satisfy the medical and nursing staff and (2) establishing a procedures manual and keeping it up to date.

Distribution and Collection.—The time required for distributing and collecting supplies and equipment in departments lacking the facilities of dumbwaiters, pneumatic tubes (large enough for sending small supplies), and conveyors, was the most frequently cited problem. If the elevators are a long distance from the CMSSS, additional time is required for both distribution and collection. To ensure emergency deliveries, one department supervisor found it necessary to maintain "an emergency messenger." Lack of a sufficient number of carts for delivery and collection of supplies was also stressed.

In departments using the daily requisition delivery system, a large number of calls to CMSSS for "forgotten items" are frequently made. In addition, in this system, since the collection of reusable supplies and equipment is not the responsibility of CMSSS, the return of these materials to CMSSS takes more time. Also, in some instances, supplies and equipment no longer needed on the units are not promptly returned to CMSSS. Another irritating problem is the use of improper requisition forms or requisition forms not properly filled out.

Communication Systems.—Problems in communication systems ranged from a lack of adequate physical means of communication to that of maintaining communications with all levels of hospital personnel. Many of these problems result from a lack of advisory, standardization, and procedures committees.

The greatest handicap for a department is trying to function with only one telephone line in the department. A lack of extension telephones in key areas in the department also perpetuates unnecessary additional problems through wasting steps or missing the call.

Other problems of communicating with personnel and department heads stem from the absence of written policies, procedures manuals, monthly newsletters, and/or meetings with other department heads. Inadequate inservice education for all nursing and medical staff and others who use CMSSS supplies and equipment may also cause problems. The failure *to teach* the importance of reading all instructions prior to using disposables results in waste of supplies and poor technique, while the failure *to read* directions before using expensive equipment results in abuse, improper use, and breakage of equipment.

Services.—For CMSSS not open 24 hours a day the greatest problem reported was the control of supplies and equipment. In hospitals having less than 24-hour service, someone is delegated the responsibility and authority to enter the department after hours to obtain necessary supplies and equipment. Problems then arise in keeping records of the supplies and equipment issued or transferred from one unit to another. It is also difficult to keep the afternoon and night administrative nursing supervisors (who must generally assume this responsibility) informed of the many details about the supplies and equipment.

Other problems reported in providing services included:

1. In hospitals where CMSSS personnel are not responsible for delivering supplies to the patient care units, sometimes unit personnel putting supplies in cabinets do not rotate the supplies by placing the new supplies behind those on hand, thus creating the possibility of keeping and later using outdated supplies.

2. In some instances, when administrative decisions were made to have the CMSSS open longer hours but the number of personnel was not increased, staffing problems occurred.

3. The use of a high number of part-time and volunteer workers created an additional workload for the supervisor because more of her time had to be spent in orientation and supervision of these employees. The danger that these employees will fail to understand the concept of following procedures *specifically* in processing materials is considerable.

4. In general, problems arise whenever additional responsibilities for providing services are delegated to CMSSS without equal consideration being given to providing the necessary physical facilities, equipment, and personnel.

Operational Problems

The problems in relation to operations included the following:

- Processing of supplies and equipment
- Delivery of supplies and return of equipment
- Waste of supplies
- Misuse of equipment
- Control, return, and maintenance of equipment
- Control of contaminated supplies and equipment
- Charges
- Budget and purchasing problems
- Miscellaneous

Processing Supplies and Equipment.—In the preparation of linen packs, problems occurred through a slow return of laundered linen, either from the hospital laundry or the commercial laundry. Another problem reported was having to prepare numerous types of packs because departments had not standardized these. Also, the accumulation of lint becomes a problem when the linen preparation area is not enclosed.

Other problems of processing exist in departments where there is a lack of space, modern equipment, and/or equipment in working condition. Again, the problem of having a sufficient number of well-trained personnel was stressed.

Delivery of Supplies and Return of Equipment.—If the distance is great and the means of transportation poor between the CMSSS and using departments, the number of messengers on the staff is frequently inadequate. Other reported problems were: the failure to return equipment after use; the loss of loan slips for equipment; failure to use proper requisition forms, to fill out forms completely, or to return charge slips for supplies; inadequate or misleading description of supplies on orders, as well as the wide differences in terminology used for supplies and equipment; and control of portable equipment after it is issued to nursing units.

Waste of Supplies.—A great need for cooperation with the nursing units in the utilization of supplies was stressed. Overstocking on units, waste of supplies, failure to follow instructions in regard to the use of supplies (particularly disposables), and poor technique in using supplies were all reported.

Misuse of Equipment.—The failure to follow instructions in the use of expensive portable equipment and/or the mishandling and breakage of equipment were reported. Thus all personnel, including medical staff, need to be oriented in the use of equipment.

Control, Return, and Maintenance of Equipment.—CMSSS is confronted with a serious problem when equipment cannot be located, particularly if a patient's life is at stake. This applies especially to portable equipment such as suction machines and oxygen apparatus. If equipment is removed without being properly checked out (this generally happens in departments not open 24 hours a day), much time is lost in locating it when needed.

Loss of loan slips issued with equipment presents another problem, as does failure to return equipment (particularly electrical) after each use so that it can be carefully checked and properly cleaned.

Difficulties arise in the maintenance of both portable equipment and the processing equipment in CMSSS when the necessary parts for repair are not available or when skilled maintenance repair men are either unavailable or their services are delayed.

Control of Contaminated Supplies and Equipment.—The control of contaminated supplies and equipment presents a very serious problem. Some hospital personnel are still under the impression that sanitizers on units are adequate for the processing of contaminated equipment. Sanitizers do *not* sterilize. All contaminated supplies and equipment must be chemically disinfected on the nursing unit or bagged and sent to CMSSS for processing. It is imperative that all personnel on patient care units carry out these procedures.

Charges.—Problems in making proper charges to patients usually result when personnel, either on the patient care units or in CMSSS are negligent in making out the necessary requisitions. Another problem is that of estimating the cost of items and determining which items are to be charged to patients. In some departments this responsibility is delegated to the CMSSS supervisor. Some respondents suggested that standard charges should be established.

Budget and Purchasing Problems.—Problems reported in budget and purchasing included:

- The inability to convince the administration to use more disposables; more studies in this area were recommended. The inability to convince the purchasing department of the need for certain supplies and equipment was also reported.
- The long delays in receiving supplies from some supply companies.
- The large and sporadic orders from some departments and the difficulty in maintaining adequate inventories of supplies.
- The time spent in weekly checking of requisition orders not filled and the reissuing of these requisitions. This all too time-consuming task should be unnecessary.
- The lack of rapport with the purchasing department; if the purchasing agent does not cooperate with the CMSSS supervisor, items are sometimes purchased which are unsatisfactory to medical and nursing staffs.
- The substitution of brands or products by the purchasing agent without consulting the CMSSS supervisor.

Miscellaneous.—The following suggestions designed to eliminate problems were made:

- Use a data processing system for maintaining inventories, filling requisitions, and making charges to patients; do not require CMSSS to handle these records.
- Establish standard charges on designated items to patients. Not only is there a wide variance as to the amount charged for a given item but the given item may not be a charge item in another hospital.
- Insist on a trial period for new types of equipment and an evaluation of new supplies.
- Insist on a good maintenance service policy, with no delays for service on processing equipment in CMSSS.

Physical Facilities and Equipment

The problems relating to physical facilities and equipment include: Floor area, workflow, facilities, and equipment.

Floor Area.—A number of supervisors stated the present amount of total floor area allotted for CMSSS was inadequate. The areas requiring more floor space were those for storage; for holding delivery and collection carts; for cooling sterilizer carriages; for supervisors' offices, male and female restrooms, and janitor's closets.

Workflow.—Some supervisors reported poor workflow patterns and concern for departments where the receiving and cleanup area was not physically separated from the remainder of the department. Others stated that there was backtracking in work activities where only one entrance existed in the department.

Facilities.—Problems relating to facilities such as elevators, dumbwaiters for clean and soiled supplies, and pneumatic tubes revealed that in a number of hospitals such facilities are located some

distance from CMSSS, are inadequate in number, or are not provided.

Equipment.—Equipment problems centered on items which were lacking, outdated, or required maintenance. Equipment listed as lacking included:

- Delivery and collection carts (in adequate numbers).
- Ultrasonic washers, rinsers, and driers.
- Washers for large items such as utensils, and glassware.
- Pressure sterilizer with cyclomatic or orthomatic controls.
- Pressure vacuum sterilizers.
- Ethylene-oxide sterilizers.
- Linen-inspection tables.
- Water stills of sufficient capacity.
- Bottle washers, rinsers, and drain carts for solution flasks; also up-to-date water stills and solution-preparation units.
- Numerous mechanical devices such as glove tester, light magnifier, heating sealers for packaging, dating, and labeling devices for supplies such as gloves, trays, and sets.

Chapter VI

Suggestions for Planning and Organizing Services

Many valuable suggestions for planning and organizing CMSSS departments were identified during the study.

PLANNING

Programing

One of the most important suggestions concerned the appointment of a programing committee. This committee should be established prior to the actual planning of the department and should include CMSSS personnel who are currently working in this service and who keep up to date on new techniques. This was emphasized by one CMSSS supervisor who stated that "equipment, proper workflow patterns, sterilization procedures, and other central service activities should be set up with the help of someone actively engaged in central service work." Another supervisor stated that she was not asked to participate in the planning with the architect until it was too late to make any changes. Still another suggested that the surgical suite supervisor be included as a member of the programing committee.

Following the appointment of a programing committee and before any plans are formulated, members of the committee should visit other CMSSS departments (of proven reputation and in the desired hospital size) to gain additional information which will help them make decisions about the proposed department.

Location

Suggestions for the location of the CMSSS emphasize the importance of accessibility to central transportation facilities such as elevators, dumbwaiters, vertical conveyors, and stairs. It should be located in a "service core" area adjoining departments from which it receives materials, such as general stores and the laundry, and should also be centrally located in relation to the departments which are the largest consumers of its services. Usually the largest consumer will be the nursing units, although in the smaller hospitals (100–199 beds) it may be the surgical department (including the recovery room).

Floor Area

In planning the total amount of floor area required, consideration should be given to the premise that services supplied by the department will increase as the needs of the hospital grow. Some experts in the field recommended that, after reviewing present needs and determining the total area for the department on that basis, an additional 25 percent should be allocated for future expansion.

Many supervisors stressed the importance of ample storage space for large equipment. The need for a storage room for such large equipment as orthopedic and oxygen therapy is often overlooked, thereby creating serious storage problems.

One supervisor in a large hospital reported that its CMSSS maintains the storeroom for all medical and surgical supplies and that general stores has no responsibility for these supplies. The storeroom is located adjacent to CMSSS and the supplies from manufacturers are delivered directly to the storeroom. Thus, considerable time is saved by eliminating the need for reissuing supplies from general stores.

Other area requirements frequently overlooked or inadequately planned include:

- Holding areas for storage of sterilizer carriages, for loaded carriages prior to sterilizing, for carriages during the cooling period following sterilization, and for carriages of sterilized supplies for the surgical suite and labor-delivery unit prior to the delivery of these supplies.
- Supervisor's office.
- Separate lockers and rest rooms for female and male personnel.
- Janitor's closets.
- Allocation of area for the clerk's desk and files.

Physical Layout, Workflow, and Equipment

The wisdom of providing sufficient floor area (and even more than was currently believed needed) was expressed by many supervisors in discussing physical layout. Others commented that more efficiency is achieved when the department is planned to include working islands rather than many small rooms, with the area large enough so that functions can be carried out properly but also sufficiently compact to require minimum walking.

Other recommendations concerned with planning a new department, included:

- Install movable glazed partitions in separating some work activities.
- Include as much movable equipment as possible, such as work tables and shelving.
- Incorporate versatility in arrangement of cabinets by having drawers with dividers and adjustable shelves.
- Use movable, adjustable shelving, or mobile shelving.
- Provide work tables with posture stools.
- Provide some cabinets with glazed doors in the sterile storage area.
- Include wide shelves for linen storage in the linen pack room.
- Insist on rapid means of transportation, such as vertical conveyors, pneumatic tubes, and dumbwaiters. Have separate conveyors and dumbwaiters for sending supplies and returning reusable items.
- Plan additional storage area for disposables.
- Provide a sufficient number of sinks.
- Physically separate the receiving and cleanup area from the rest of the department.
- Plan for the area to be well ventilated—include air conditioning and adequate illumination without glare, especially in the clean-work area.
- Include three entrances: one for receiving soiled supplies and equipment for processing; one for receiving materials from general stores and the laundry; and the other for issuing.
- Plan the workflow pattern so that the processing of supplies and equipment may be accomplished in an efficient manner, with the flow of work continuous from receiving to issuing without the need to retrace steps. If possible, utilize industrial engineering concepts and request the assistance of a methods engineer.

Disposables

The use of disposables whenever possible was highly recommended, especially for patients with infectious diseases, such as infectious hepatitis. Other suggestions included:

- Consider wide use of disposables, number, and cost.
- Give CMSSS responsibility for product evaluation and choice; insist on guarantee of sterility.
- Before selecting disposable items, test various types to determine which is most suitable.

ORGANIZATION

Administrative Structure

It was recommended that the administration consider CMSSS as a separate department and the supervisor a department head. When the supervisor is directly responsible to administration, much "red tape" and waste of time can be eliminated. Selecting a well-qualified person for this position is essential to its proper operation. Coordinate all planning and organization of the service with the supervisor and her staff.

Personnel

Some of the qualifications of the CMSSS supervisor were described earlier. Much of the background needed to function efficiently may be acquired through additional training and education.

The need for inservice education programs and for studies aimed at improving procedures and training employees, was indicated. Requesting assistance from salesmen in teaching employees the use of new equipment was also suggested.

Communications

Good communications are necessary within the CMSSS department and with other departments to learn what is needed and to maintain an exchange of ideas. Following are other specific suggestions:

- Appoint an advisory committee to CMSSS.
- Set up and maintain a committee (standardization) to review with the supervisor, on a regular basis, such details as contents of trays and charges to patients.
- Establish a procedures book, listing all contents of trays, and a file index specifying where all supplies are located in the department.
- Appoint the supervisor to membership on the nursing procedures, standardization, hospital infection, and disaster committees.

Systems of Distribution and Collection

Distribution of supplies and equipment should be the responsibility of CMSSS. For efficiency, floor quotas should be set up. A control system is necessary for portable equipment so it is possible to know at all times where equipment may be located.

In labeling supplies abbreviations should not be used; uniform labels should be used for trays and sets.

Specific procedures and scheduled hours should be established for the collection of soiled items from using departments. Holding areas should be designated in all using departments.

Miscellaneous Suggestions

Additional suggestions included that:

- An advanced study be made of desired goals CMSSS should achieve;
- Problems affecting functions of the service be studied.
- Greater participation of personnel in local and national organizations be encouraged, as well as attendance at workshops and institutes.

Appendix A

Summary Tables, 1963

Appendix Table A. Number of Hospitals and Beds by State, 1963

State	Hospitals	Beds
Total Number Reported	251	76,421
Arizona	2	443
California	15	3,935
Colorado	4	1,294
Connecticut	5	1,751
Delaware	2	741
Dist. of Col.	1	813
Florida	5	1,265
Idaho	1	115
Illinois	46	12,017
Indiana	8	2,306
Iowa	7	2,079
Kansas	7	2,423
Kentucky	4	737
Louisiana	2	225
Maryland	5	1,148
Massachusetts	1	318
Michigan	10	3,578
Minnesota	13	4,354
Mississippi	1	190
Missouri	9	3,092
Nebraska	1	273
New Hampshire	1	98
New Jersey	15	5,002
New York	17	6,395
North Carolina	3	1,257
North Dakota	2	414
Ohio	14	5,000
Oklahoma	6	1,894
Oregon	1	214
Pennsylvania	12	4,699
Rhode Island	1	676
South Carolina	1	84
Tennessee	2	497
Texas	3	1,546
Utah	1	188
Virginia	3	960
Washington	2	265
Wisconsin	17	3,040
Wyoming	1	195

Appendix Table B. Distribution of Hospitals and Beds by Size of Hospital, 1963

Size of hospital	Number of—		Percent distribution	
	Hospitals	Beds	Hospitals	Beds
Total Number Reported	251	76,421	100.0	100.0
50–99	21	1,668	8.4	2.2
100–199	62	9,429	24.7	12.3
200–299	63	15,579	25.1	20.4
300–499	67	24,261	26.7	31.7
500 and over	38	25,484	15.1	33.4

Appendix Table C. Classification of Beds by Size of Hospital, 1963

Size of hospital	Total beds	Surgical and Medical			Obstetrical	Pediatrics	Intensive care unit	All other
		Total	Surgical	Medical				
	Number of beds							
Total Number Reported	76,421	55,904	28,704	27,200	8,534	4,695	1,270	6,018
50- 99	1,668	1,337	674	663	235	77	19	–
100-199	9,429	6,966	3,480	3,486	1,322	640	68	433
200-299	15,579	11,679	5,854	5,825	1,053	1,034	275	638
300-499	24,261	17,852	9,120	8,732	2,710	1,780	444	1,475
500 and over	25,484	18,070	9,576	8,494	2,314	1,164	464	3,472
	Percent distribution							
Total	100.0	73.2	37.6	35.6	11.2	6.1	1.7	7.9
50- 99	100.0	80.1	40.4	39.7	14.1	4.6	1.1	–
100-199	100.0	73.9	36.9	37.0	14.0	6.8	0.7	4.6
200-299	100.0	75.0	37.6	37.4	12.5	6.6	1.8	4.1
300-499	100.0	73.6	37.6	36.0	11.2	7.3	1.8	6.1
500 and over	100.0	70.9	37.6	33.3	9.1	4.6	1.8	13.6

Appendix Table D. Average Number of Beds in Specified Types of Hospital Units, 1963

Size of hospital	Intensive care units			Recovery rooms			Labor rooms		
	Hospitals reporting	Number of beds		Hospitals reporting	Number of beds		Hospitals reporting	Number of beds	
		Total	Per hospital		Total	Per hospital		Total	Per hospital
Total Number Reported	102	1,270	12	211	2,028	10	220	1,339	6
50- 99	3	19	6						
100-199	7	68	10						
200-299	26	275	11						
300-499	36	444	12						
500 and over	30	464	15						

ippendix Table E. Average Day's Activities in Hospitals Reporting Data on CMSSS, 1963

Size of hospital	Average daily census			Daily admissions			Births			Surgical operations		
	Hospitals reporting	Total number	Per hospital	Hospitals reporting	Total number	Per hospital	Hospitals reporting	Total number	Per hospital	Hospitals reporting	Total number	Per hospital
Total Number Reported	249	60,436	243	249	7,704	31	235	1,245	5	243	4,172	17
50– 99	21	1,186	56	21	181	9	18	29	2	20	90	5
100–199	60	7,016	117	60	1,040	17	55	154	3	58	508	9
200–299	63	12,523	199	63	1,694	27	63	264	4	61	813	13
300–499	67	19,338	289	67	2,494	37	65	392	6	66	1,340	20
500 and over	38	20,373	536	38	2,295	60	34	406	12	38	1,421	37

Appendix Table F. Outpatient Services Provided Annually in Hospitals Reporting Data on CMSSS, 1963

Size of hospital	Annual outpatient services					
	Individuals served			Outpatient visits		
	Hospitals reporting	Number (in thousands)		Hospitals reporting	Number (in thousands)	
		Total	Per hospital		Total	Per hospital
Total Number Reported	118	2,749.7	23.3	174	6,144.1	35.3
50- 99	10	31.4	3.1	11	113.4	10.3
100-199	23	157.6	6.9	29	544.3	18.8
200-299	24	252.2	10.5	49	847.2	17.3
300-499	33	644.7	19.5	51	1,704.8	33.4
500 and over	28	1,663.8	59.4	34	2,934.4	86.3

Appendix Table G. Immediate Superior of the CMSSS Supervisor, by Size of Hospital, 1963

Size of hospital	Immediate superior of CMSSS supervisor							
	Present				Preferred			
	Hospitals reporting	Hospital Administrator	Chief, Nursing department	Other [1]	Hospitals reporting	Hospital Administrator	Chief, Nursing department	Other [1]
	Number							
Total	247	41	193	13	238	85	142	11
50- 99	21	7	13	1	21	10	11	–
100-199	61	7	50	4	59	20	37	2
200-299	63	12	50	1	61	20	37	4
300-499	65	6	54	5	62	22	37	3
500 and over	37	9	26	2	35	13	20	2
	Percent distribution							
Total	100.0	16.6	78.1	5.3	100.0	35.7	59.7	4.6
50- 99	100.0	33.3	61.9	4.8	100.0	47.6	52.4	–
100-199	100.0	11.5	82.0	6.6	100.0	33.9	62.7	3.4
200-299	100.0	19.0	79.4	1.6	100.0	32.8	60.7	6.6
300-499	100.0	9.2	83.1	7.7	100.0	35.5	59.7	4.8
500 and over	100.0	24.3	70.3	5.4	100.0	37.1	57.1	5.7

[1] Includes the operating room supervisor and the pharmacist.

Appendix Table H. Hospital CMSSS Departments Having Policy and Procedures Manuals and Inservice Programs, 1963

Size of hospital	Central service departments having—								
	Policy manual			Procedures manual			Inservice program		
	Hospitals reporting	Yes	No	Hospitals reporting	Yes	No	Hospitals reporting	Yes	No
Total	204	169	35	238	225	13	211	186	25
50- 99	16	15	1	20	20	-	14	11	3
100-199	46	37	9	58	57	1	49	41	8
200-299	51	41	10	62	57	5	52	47	5
300-499	60	50	10	64	60	4	64	57	7
500 and over	31	26	5	34	31	3	32	30	2

Appendix Table I. Average Number of CMSSS Personnel by Size of Hospital, 1963

Size of hospital	CMSSS				
	Hospitals reporting	Average number per hospital			
		Full-time personnel	Part-time personnel [1]	Total full-time equivalent [2]	Additional F.T. personnel needed [3]
Total Number Reported	251	14.4	1.2	15.6	2.8
50- 99 beds	21	4.1	0.7	4.8	1.4
100-199	62	7.3	.9	8.2	2.0
200-299	63	10.6	1.1	11.7	2.1
300-499	67	18.3	1.4	19.7	3.3
500 and over	38	31.1	1.4	32.5	4.6

[1] Includes volunteer workers.
[2] Represents the personnel employed full-time plus the converted hours worked by part-time personnel, based on a 40-hour week.
[3] The additional number of full-time personnel needed for optimum efficiency as reported by CMSSS supervisors.

Appendix Table J. Methods of Distribution From and to CMSSS, by Size of Hospital, 1963

Methods of distribution	Size of hospital				
	50–99	100–199	200–299	300–499	500 and over
Total Number Reporting	21	62	63	60	38
	Percent of hospitals reporting				
From and To CMSSS: [1]					
Cart	66.7	66.1	84.1	68.2	86.8
Dumbwaiter	14.3	22.6	31.7	31.8	23.7
Elevator	23.8	35.5	41.3	37.9	50.0
Messenger (CS)	23.8	30.6	54.0	43.9	39.5
Messenger (Other)	33.3	41.9	36.5	28.8	42.1
Pneumatic Tube	-	4.8	4.8	6.1	10.5
From CMSSS Only: [2]					
Cart	9.5	9.7	3.2	13.6	5.3
Dumbwaiter	9.5	11.3	23.8	30.3	18.4
Elevator	-	6.5	-	10.6	15.8
Messenger (CS)	19.0	22.6	15.9	19.7	13.2
Messenger (Other)	9.5	6.5	9.5	18.2	7.9
Pneumatic Tube	-	9.7	14.3	22.7	26.3

[1] Represents the methods used by CMSSS to distribute supplies and to collect soiled items.
[2] Represents the methods used by CMSSS for the one-way distribution of supplies.

Appendix Table K. Hours of Service Maintained by CMSSS, by Size of Hospital, 1963

Size of hospital	Hours of service maintained by CMSSS						
	Hospitals reporting	Opened 24 hours per day		Opened less than 24 hours per day			
		Number	Percent of total	Hospitals reporting	Persons called for needed supplies		
					Night supervisor	Nursing supervisor	Other
Total	249	116	46.6	133	93	22	18
50- 99	21	6	28.6	15	9	1	5
100-199	61	17	27.9	44	28	10	6
200-299	63	20	31.7	43	37	3	3
300-499	66	48	72.7	18	11	4	3
500 and over	38	25	65.8	13	8	4	1

Appendix Table L. Type of Materials Provided by CMSSS to Other Departments, 1963

Type of materials provided by C. S. departments	Hospitals having less than 300 beds					Hospitals having 300 beds or more				
	Nursing unit	Surgical suite	Labor-delivery unit	Nursery	Outpatient dept.	Nursing unit	Surgical suite	Labor-delivery unit	Nursery	Outpatient dept.
Total Number Reported	129	122	120	112	135	97	96	93	91	103
	Percent of departments receiving specified materials									
Inhalation Equipment	67.4	17.2	23.3	25.0	37.8	50.5	16.7	21.5	24.2	35.0
Instruments	90.7	41.8	41.7	42.0	63.0	94.8	18.7	24.7	42.9	54.4
Intravenous Sets	68.2	46.7	60.8	52.7	62.2	75.3	49.0	59.1	60.4	60.2
Intravenous Solution	62.0	45.9	50.8	46.4	54.1	72.2	54.2	65.6	62.6	62.1
Irrigation Solutions	90.7	71.3	60.0	52.7	75.6	84.5	64.6	64.5	71.4	71.8
Needles and/or Syringes	92.2	70.5	80.8	79.5	83.0	99.0	59.4	82.8	85.7	79.6
Sterile Dressings	94.6	68.9	55.8	60.7	80.7	93.8	52.1	54.8	64.8	76.7
Sterile Linen	84.5	68.9	59.2	58.0	67.4	84.5	68.7	64.5	68.1	62.1
Surgical Gloves	83.7	77.9	75.0	46.4	85.2	91.8	85.4	90.3	71.4	89.3
Treatment Trays/Sets	93.8	54.1	48.3	49.1	73.3	97.9	43.7	50.5	63.7	75.7

Appendix Table M. Average Monthly Use of Supplies by Size of Hospital, 1963

Type of supplies	Size of hospital														
	50–99			100–199			200–299			300–499			500 and over		
	Hospitals reporting	Number		Hospitals reporting	Number		Hospitals reporting	Number		Hospitals reporting	Number		Hospitals reporting	Number	
		Total	Per hospital		Total	Per hospital		Total	Per hospital		Total	Per hospital		Total	Per hospital
	Average monthly usage of supplies														
TRAYS OR SETS:															
Bladder Irrigation Tray	16	1,229	77	54	10,641	197	46	9,649	210	55	31,494	573	25	20,557	822
Catheterization Tray	18	2,096	116	57	11,439	201	55	15,301	278	62	31,226	504	33	22,159	671
Cut-Down (Venesection) Tray	16	52	3	58	558	10	54	1,110	21	59	1,459	25	34	3,434	101
Dressing Tray	18	3,168	176	54	21,667	401	49	24,162	493	59	45,104	764	30	33,454	1,115
Emergency Suture Set	11	1,015	92	48	7,614	159	34	4,676	138	41	6,047	147	24	6,623	276
Lumbar Puncture Tray	17	145	9	57	1,127	20	54	1,614	30	61	3,729	61	35	4,392	125
GLOVES	18	19,278	1,071	53	100,509	1,896	49	145,535	2,970	59	429,593	7,281	29	485,684	16,748
NEEDLES	14	19,323	1,380	48	189,588	3,950	39	170,965	4,384	53	539,407	10,177	31	667,342	21,527
SYRINGES	17	33,028	1,943	51	201,408	3,949	45	184,888	4,109	59	539,893	9,151	29	666,914	22,997
NEEDLE & SYRINGE COMB	11	81,001	7,364	41	133,728	3,262	34	201,847	5,937	42	353,775	8,423	19	234,140	12,323

Appendix Table N. Reported and Estimated Need of Net Square Feet of Floor Area for CMSSS, 1963

Size of hospital	Hospitals reporting		Reported average square feet [1]		Reported average needed square feet [2]	
	Number	Average No. beds	Per hospital	Per bed	Per hospital	Per bed
50– 99	13	81	812	10	1,427	17
100–149	21	118	1,064	9	1,641	14
150–199	28	176	1,530	9	2,653	15
200–249	25	219	1,756	8	2,276	11
250–299	21	268	2,034	8	3,090	12
300–349	24	319	2,496	8	4,001	12
350–399	14	367	2,443	7	3,637	10
400–499	13	433	2,906	7	3,875	9
500–599	12	524	3,524	7	3,867	7
600 and over	16	785	6,025	8	6,619	9

[1] Reported by 187 hospitals.
[2] Reported by 71 hospitals.

Appendix B

Definitions

Agent.—That substance or element which is capable of producing a reaction.

Antiseptic.—A substance which, when applied to microorganisms, stops or inhibits their growth, depending on the concentration and type of chemical used.

Antisepsis.—See disinfection.

Area.—See floor area.

Bagged.—Method of enclosing supplies and equipment to prevent spread of infection or to maintain sterility. Paper or plastic bags are usually used.

Central Dispatch or Central Distribution.—Indicates that a group of services are under the direction of one person, usually an assistant administrator or purchasing agent. The study found that, in addition to central medical and surgical supply service, some hospitals included any or all of the following: purchasing, general stores, laundry, housekeeping, messenger service, maintenance, and security.

Central Medical and Surgical Supply Service.—The study indicated that this title is the most appropriate for the service or department responsible for providing supplies and equipment required by all departments that render patient care. Also, it should receive, collect, process, store, inventory, issue, and distribute supplies and equipment used in the care and treatment of patients. The scope of services of this department will depend on the individual hospital. Other titles such as Central Service, Central Supply, Central Sterile Supply, Central Service Supply are defined to be synonymous.

Cleaning.—Removing soil or other extraneous materials from any object or surface; implies using water and an appropriate cleaning agent.

Collecting Materials and Equipment.—Collecting used and contaminated materials, including equipment, from using departments for processing. Collections are usually made by CMSSS personnel.

Contamination.—Presence of harmful microorganisms.

Detergent.—A cleaning agent which facilitates removal of grease or soil.

Disinfection, Chemical.—Process of using chemical agents to inhibit or destroy pathogenic microorganisms on inanimate materials and on body surfaces. The terms "disinfection" and "chemical disinfection" frequently are used interchangeably. In hospitals, disinfection consists of two major types of applications:

The first is the *disinfection* of inanimate materials such as floors, furniture, equipment, and instruments. Chemical agents used are referred to as *disinfectants*, and effectiveness is contingent upon the concentration and type of disinfectant used. All disinfectants do not destroy resistant spores and viruses.

The second application is the disinfection of body surfaces; a practice called *antisepsis* to distinguish

this application from disinfection in general. Chemicals used in this application become *antiseptics*. Because antiseptics are applied directly to skin and mucous membranes, the maximum concentration of a germicidal chemical which can be used in this way is limited by its toxicity for these tissues.

Equipment.—Items of durable nature such as an instrument, suction apparatus, or resuscitator.

Floor Area.—Pertaining to allotted number of square feet of area (two dimensional—width x breadth).

Issuing of Supplies and Equipment.—Generally refers to systems used which include: (1) quota system by which the established level of supplies is maintained at areas of use; (2) cart system whereby a cart holding the established level required for a 24-hour period is delivered daily; and (3) requisition system by which all using areas send a list of supplies and equipment needed; usually all charge items are requisitioned just prior to time of use.

Linen, Sterile.—Any sterile comprehensive set of linen to be used in procedures involving aseptic technique, such as a surgical operation, the delivery of a newborn or for any therapeutic and/or diagnostic procedure. Generally referred to as a pack.

Microorganism.—Any extremely small living animal or plant which is visible only when observed through a microscope.

Pack.—See linen.

Processing.—Includes any series of actions or operations necessary for the preparation of supplies and equipment for use in rendering patient care. Operations necessary for *processing reusable items* include receiving, cleaning, assembling, inspecting, packaging, labeling, sterilizing, storing, inventory control, and issuing. The operations necessary for *processing disposable items* include receiving, inventory control, storing, and issuing.

Receiving Supplies and Equipment.—Includes: (1) receiving stock supplies and equipment from general stores; (2) receiving clean linen from the laundry for preparation as packs; and (3) receiving used equipment from nursing units and specialty areas for processing.

Sanitization.—Any process used whereby microorganisms on an article are reduced in number to a level considered safe for human use. The process may be manual or mechanical, carried out with water containing a suitable detergent followed by a topical application of a disinfectant or by streaming steam. Sanitization does *not* sterilize.

Set.—An assembled group of instruments and supplies required in the examination or treatment of a patient. See treatment tray.

Solutions, External.—Sterile liquids that may be used for irrigation, or as a cleansing agent. Frequently referred to as irrigating solutions, topical solutions and surgical solutions.

Solutions, Parenteral.—Sterile liquids that may be administered internally. These fluids are also commonly referred to as intravenous solutions.

Space.—Pertaining to volume, number of cubic feet (three dimensional—width x breadth x height).

Sterilization.—Any process used to completely destroy all living microorganisms.

Storage of Supplies and Equipment.—Areas which must be provided for: (1) the storage of sterile disposable items and stock supplies received from general stores; (2) the storage of clean equipment such as portable, orthopedic, and inhalation therapy equipment; and (3) the storage of processed sterile supplies prior to issue.

Stores, General.—Facility of hospital which stores in bulk form all supplies and equipment that are required within the hospital. It also inventories all general supplies and equipment. The term central stores is sometimes used interchangeably with general stores.

Supplies.—Items ordinarily consumed by use.

Tray, Treatment.—Any tray equipped with needles, syringes, instruments, or other supplies processed for use in the examination or treatment of a patient. Treatment trays are prepared for particular procedures and are named accordingly, for example, angiogram tray, liver biopsy tray, and tracheotomy tray. Treatment trays often are referred to as sets, such as colostomy irrigation set and suture set.

Utensils.—Receptacles used for the following purposes: (1) in the collection of materials such as dry or liquid waste; (2) by or for patients in routine care, such as bath basins, bedpans, urinals; (3) in procedures involving aseptic technique such as surgical operations, delivery of newborn, and for any therapeutic and/or diagnostic procedures.

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